

The Future of Heavy Lift

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THE FUTURE OF HEAVY LIFT

The development of the "Operational Maneuver from the Sea" (OMFTS) concept will change Marine Corps Aviation forever. Marine Air will be required to fly faster and farther as maneuver space and logistics tails grow. While the MV-22 Osprey will provide this "Over the Horizon" (OTH) capability, it is strictly a medium lift aircraft. It will never be able to provide the heavy lift support currently provided by the CH-53E helicopter. When the CH-53's service life expires around the year 2025, a replacement heavy lift aircraft will be needed. A tilt rotor aircraft is the only way to go for the Marine Corps to fully maximize OMFTS from an aviation perspective.

Ship to Objective Maneuver (STOM) views the sea as maneuver space, using the sea as both a protective barrier and an unrestricted avenue of approach. Sea basing of fire and logistics support will reduce the "footprint" of forces ashore while the tempo of operations is maintained (Expeditionary 3200-B-1). As a result, assault units will not have to pause ashore while a beachhead is established. To support STOM, Marine Air Ground Task Force (MAGTF) air assets will be required to fly extended ranges at increased airspeeds to prosecute targets deep in hostile territory. The MV-22 is the Marine Corps' current answer to implementing OMFTS/STOM from an aviation perspective.

The Osprey will eventually replace the Marine Corps' CH-46E and CH-53D. It has an increased combat radius of 200 nautical miles when carrying twenty-four combat loaded troops or 50 nautical miles when carrying a 10,000-pound load. Its airspeed of 240 knots will also enable the MV-22 to cover these distances at twice the rate of current Marine helicopters ("Aviation" B-4). With these capabilities, the Osprey will provide the Marine Corps with an outstanding medium lift platform well into the 21st century.

The CH-53E Super Stallion has been the heavy lift workhorse of the MAGTF since it was first delivered in 1981 (Future 1). It can lift a M198 Howitzer, along with its gun crew and 1,000 pounds of ammunition, and reposition it 30nm, under high, hot ambient conditions (high, hot conditions decrease the performance of a helicopter due to decreased air density and a variety of other reasons). In the assault support role, its combat radius is 270nm when carrying 36 combat loaded Marines. As the airframe grows older, these capabilities have begun to gradually decline. A Service Life Extension Program (SLEP) has been proposed that will modernize the platform and extend its service through 2025 (Future 5). After 2025, the Marine Corps will need to have a replacement ready for the Super Stallion. A decision has not yet been made on the design of the CH-53E

replacement, currently referred to as the Joint Common Lift (JCL).

While the CH-53E has effectively proven the helicopter's ability to perform heavy lift, tilt rotor technology is the way of the future. The home page of the Osprey Online Website states,

"The MV-22 is the highest priority for Marine Corps aviation and is critical to the implementation of the Naval Services' OMFTS concept. This medium lift tilt rotor aircraft represents a revolutionary leap in our ability to project forces from over the horizon toward inland objectives."

It is clear that the Marine Corps is seeking to maximize the benefits of tilt rotor technology as we enter the 21st Century.

Once assault forces are inserted deep in hostile territory by the MV-22, they will need to be supported logistically. Since not everything the Marine Corps needs to lift in combat weighs less than 10,000 pounds (the MV-22's external load limit), the JCL will need to possess a combat radius similar to the Osprey's radius of 200nm.

It can be argued that both the helicopter and tilt rotor designs are relatively equal regarding the speed with which they can move external loads. This is due to the fact that the speed at which heavy external loads are flown has nothing to do with the capability of the platform flying the load, and everything to do with the aerodynamic characteristics of the load itself.

Many loads will begin to behave in an unstable manner as airspeed is increased in flight (Future 4). The benefit of the tilt rotor aircraft will be its ability to return to the pickup zone in half the time of its rotary wing counterpart.

That speed advantage will also be very apparent when transporting internal loads or combat loaded Marines. The Marine Corps' requirements listed in Enclosure (1) call for the JCL to cruise at 275-450 knots with a combat radius of 300nm (Overarching 11). Current rotary wing aircraft cannot attain these speeds due to the aerodynamic effects on the rotor blades, however these airspeeds are not a problem for a tilt rotor aircraft. Hence, the only option available to keep up with the MV-22's ability to quickly build up forces at those airspeeds is tilt rotor technology.

Another issue for consideration is self-deployability. The Marine Corps' requirements for the JCL include a self-deployable range of 2,100nm with a single aerial refueling (Encl (1)). At 275-450 knots this range is very feasible for the tilt-rotor JCL. At the slower airspeeds that would be flown by a rotary wing JCL the range would simply not be possible. This self-deploying capability provided by a tilt rotor JCL would free up space on amphibious shipping while giving the MAGTF Commander the flexibility to quickly augment his forces from land-based

units. The JCL and Osprey would essentially be able to enter the theater together, poised for the OTH fight.

Some may wonder if the Marine Corps will even need heavy lift in the future. A memo entitled "The Future of Heavy Lift" addresses that concern in the following:

"In May 2000, MAWTS-1 published the results of an exhaustive year-long study concerning the operational potential and logistical capabilities of an amphibious Marine Expeditionary Brigade (MEB) in the year 2010. The study utilized MV-22s and CH-53Es as the aviation lift assets. The study validated the assumption that heavy lift plays an absolutely vital role in the sustainment of a Marine Air Ground Task Force (MAGTF). During the study, personnel were unable to keep the MEB supplied without the responsiveness and lifting capacity of the CH-53E. Among 20 lessons learned from the study concerning amphibious ship to shore movement, the analysis concluded that the Marine Corps is getting "heavier" not "lighter" in terms of equipment weight." (Future 4)

Therefore, the need for heavy lift assets will not go away.

The affordability of the JCL is a large concern facing the Marine Corps. The cost will depend on several factors, including the design (rotary wing or tilt rotor) and whether it is purchased jointly or by individual services. The Joint Requirements Oversight Council (JROC) has estimated that a rotary wing design would cost 63 million dollars per unit while the tilt rotor would cost 72.4 million dollars per unit (Encl (2))(Overarching 13). If the service life of the CH-53E can be extended to the year 2025, it will give the Marine Corps the financial flexibility necessary to field the JCL at these costs

("Aviation" B-4). If, as planned, the JCL is purchased jointly, the cost of a future heavy lift program is reduced by 9.2 billion dollars (Encl (3))(Overarching 17). The joint purchase of the JCL will also reduce the cost of operation and maintenance over time. This will simply be due to the commonality of parts and maintenance experts across the joint spectrum.

As of March 2002, there is no answer regarding the JCL's ability to operate from an amphibious platform. The obvious answer is that the Marine Corps and Navy must make it work. Whether that will be accomplished through new shipping assets or creative aircraft design remains to be seen. Again, the whole idea behind the JCL is to augment the Marine Corps' ability to move from ship to objective from over the horizon. The only way to augment that ability is to effectively operate the JCL aboard ship.

The Aviation Implementation Plan is the document in which the Deputy Commandant for Aviation establishes aviation policy, develops requirements, and defines fiscal priorities based upon the Commandant of the Marine Corps' guidance ("Aviation" ii). It states,

"the Commandant has expressed interest in quad-tilt rotor technology that might fill the JCL niche as well as provide us with the final pillar of our OMFTS and STOM concepts - a truly robust expeditionary logistics capable aircraft..." ("Aviation" B-4)

There has been much controversy surrounding the implementation of tilt rotor aircraft. Three Marine MV-22 mishaps in the past 10 years have brought negative attention from the press, the American public, and some influential members of the United States Government. Regardless of this attention, the Marine Corps is not likely to give up on tilt rotor technology. It has already invested billions of dollars into the program and has based the strategy of future MAGTF aviation around its capabilities.

"MAGTF Aviation and Operational Maneuver from the Sea" states,

"the Aviation Combat Element (ACE) requires the ability to effectively operate while being logistically supported from a sea base, yet it must also retain the ability to provide flexible, adaptable and maneuverable support from shore locations." (MAGTF 9)

The speed and range of MAGTF heavy lift assets needed to operate from a sea base located over the horizon must be compatible with the MV-22. The JCL and Osprey team will enable the MAGTF to rapidly build combat power ashore from over the horizon deep in our adversaries' territory. If space on amphibious shipping is unavailable, but heavy lift assets are needed, the self-deployability of the tilt rotor JCL from land bases will prove indispensable. Also, without the ability to supply our forces rapidly with heavy equipment, at extended ranges, the true

impact of the MV-22 will never be realized. A tilt-rotor JCL is the only way to go for the Marine Corps to fully maximize OMFTS from an aviation perspective.

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